

Annual Report 2017





Custom House



Government Buildings

Abbotstown



Backweston



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INTRODUCTION

by the State Chemist



I am very pleased to present this Annual Report on the work of the State Laboratory for 2017. It was a busy year and one in which the Laboratory continued to grow its workforce. Two members of staff retired during the year and six others left either to take up positions elsewhere or to return to their parent departments on completion of secondments. However, thirteen new staff joined the laboratory including one chemist and seven laboratory analysts, which meant that at the end of 2017, the laboratory's workforce was at its highest level in over 10 years.

This high staff turnover, along with seven students who were taken on for 6 month work-placement during the year, had a very positive and energising effect on the Laboratory. However, it did place a significant training burden on existing staff and there continued to be a strong focus on cross-training and upskilling staff across all work areas. Due to the highly specialised and innovative nature of the work, it is a priority for the Laboratory to develop and retain highly skilled and expert staff. To do this, the Laboratory must provide a work environment where staff are engaged and motivated and have the opportunities to develop interesting and meaningful careers in chemistry.

Therefore, there was a continued focus throughout the year on implementing the agreed action plan developed in response to the 2015 Civil Service Employee Engagement Survey. The survey results indicated that staff had a high level of competence, were engaged and resilient and felt positive about their work but there were challenges in the areas of information sharing, leadership and performance standards, career development and social support.

The CSEES action plan focussed on improving leadership and performance management capability whilst fostering a culture of information sharing across the Laboratory and induction procedures for new staff and students were significantly improved. The results of the second survey, which took place during September 2017, will be available in mid-2018 and it is hoped that the results will show improved ratings for the areas focussed on in the action plan and reflect higher staff engagement and a more positive work environment.

As a regulatory laboratory providing analytical results to its clients, which in many cases can form the basis for important decisions or court prosecutions,

the most important aspect of the State Laboratory's work is the quality of its results. For this reason, the Laboratory operates a quality system and holds accreditation to ISO 17025 for a significant proportion of its testing. A new version of this international standard was issued in 2017 and the State Laboratory was represented on the ISO working group responsible for the revision of this standard, which took over 2 years to complete its work.

The ability to constantly innovate and provide analytical solutions to new challenges is also a key focus for the Laboratory and during 2017 it continued to invest in new instrumentation and develop and expand its testing capability to respond to client needs. The Laboratory also invested in its IT infrastructure and expanded its IT Unit by recruiting an additional IT qualified staff member. This had become essential to provide the required level of service to maintain the Laboratory's IT network and deliver on day-to-day IT support functions.

The Eurachem Ireland committee, for which the State Laboratory provides the secretariat and current Chair, was also very active during the year. The committee organised two workshops in 2017. A TrainMiC® Workshop was delivered by TrainMiC® trainers, trained by the European Commission's Joint Research Centre, in April and was very well attended. The October workshop on *Hyphenated Analytical Techniques – Fundamentals, Applications and Challenges* was held in Backweston and was attended by approximately fifty people.

Full details of the work of the State Laboratory and its achievements in 2017 are presented in this annual report. As always, without the commitment and dedication of its staff none of this would have been possible. I would like to sincerely thank all the staff of the Laboratory for their hard work, enthusiasm and support throughout the year.

Ita Kinahan,
State Chemist



OVERVIEW

The State Laboratory is a scheduled office under the aegis of the Department of Public Expenditure and Reform and it is the Government's principal analytical chemistry laboratory. Its high level objective is to provide an accredited, high quality and timely chemical analysis and advisory service to Government Departments and Offices, which supports their policies, regulatory programmes and strategic objectives, particularly in the areas of food and feed safety; revenue collection; fraud prevention; public health and environment protection. It also provides centralised forensic toxicology services to the Coroners and other public sector clients.

In 2017, a total of 12,833 samples were analysed for 524,064 analytes, an increase of 4% on the total samples tested in 2016. A 20% reduction in the number of hydrocarbon oil samples submitted by Customs and Excise officers to be tested for fraud purposes was largely offset by a 27% increase in the number of samples submitted for testing for residues of veterinary drugs.

Analytical chemistry is a continually evolving area and staff of the Laboratory keep abreast of technological changes and take advantage of the opportunities offered by new technology to improve the quality and efficiency of the service provided to our clients. EU and Irish legislation is regularly updated to reflect technological developments and the Laboratory must continually update and improve its methods of analysis. In 2017, new methods of analysis were developed and existing methods were extended so that a total of 41 new tests were introduced, using a variety of analytical techniques.

The Laboratory has an important advisory function, particularly in the Customs and Excise area, and its staff act as the Irish representatives at EU scientific committees and technical working groups on behalf of Revenue and the Department of Business, Enterprise and Innovation (DBEI). Laboratory staff also actively participate and represent Ireland as national experts in international standardization bodies such as Codex Alimentarius, the European Committee for Standardisation (CEN),

Eurachem and the Consultative Committee on the Amount of Substance (CCQM).

The Laboratory has been designated as Ireland's main Official Control Laboratory for animal feedingstuffs and as a National Reference Laboratory (NRL) for parameters such as nutritional additives for use in animal feed, veterinary residues in food of animal origin and dioxins and other contaminants in feed and food. Staff collaborate with the EU Reference Laboratory (EURL) in their area of competence, attend NRL network meetings and workshops, and disseminate information supplied by the EURL to the competent authority and official national laboratories.

In 2017, the State Laboratory was also designated by the Department of Health as the testing laboratory for the purposes of the European Union (Manufacture, Presentation and Sale of Tobacco and Related Products) Regulations 2016.

National and international acceptance of results of analysis requires laboratories to have third party peer accreditation of its methods of analysis. The State Laboratory operates in accordance with a documented quality system based on an international standard for competence of testing laboratories (ISO/IEC 17025) and is accredited by the Irish National Accreditation Board as being in compliance with this standard for specific areas of work (INAB Reg. No. 146T). The Laboratory successfully underwent an annual assessment visit by INAB in 2017 and at the end of 2017 it was accredited for 50 test methods covering 501 individual analytes.

This annual report details the implementation of the State Laboratory's Strategy Statement for 2017 and highlights the Laboratory's main activities and achievements under each Strategic Goal.

Numbers of Samples Tested

Strategic Goal	No. of Samples	No. of Analytes Tested For
Food and Feed Safety	4,721	35,015
Revenue Collection and Fraud Prevention	1,953	8,806
Forensic Toxicology Service	5,824	477,195
Public Health and Heritage Protection	137	147
Veterinary Toxicology Service	198	2,901
Overall Total	12,833	524,064

PROGRESS IN RELATION TO GOALS

Strategic Goal 1

Support National Food and Feed Safety Programmes

Strategic Goal 1: Support National Food and Feed Safety Programmes

As Ireland is a major food exporter, monitoring and controlling aspects of food and animal feed safety is a high priority. The State Laboratory assists the Department of Agriculture, Food and the Marine (DAFM) and the Food Safety Authority of Ireland (FSAI) in ensuring the quality and safety of Irish food and food products by monitoring compliance with European and national legislation governing the production, distribution and sale of animal feedstuffs and by testing a wide range of foods for veterinary residues and other contaminants.

Animal Feedingstuffs

Animal feed is one of the most important components of the production chain of food of animal origin. In economic terms, animal feed accounts for up to 70% of the total costs of animal production and has an impact on animal health and productivity as well as on food safety and quality. The aim of animal feed controls is to ensure that feedingstuffs are of good quality and do not constitute a hazard to human or animal health. The controls are implemented through risk based inspections and sampling of feedingstuffs at all stages of the feed chain.

The State Laboratory is the principal laboratory responsible for feedingstuffs analysis in Ireland. Samples of feed materials, feed additives, mineral mixtures and compound feeds are routinely tested to ensure that they contain the declared nutrients (protein, fat, starch and minerals), micro-nutrients (trace elements, vitamins), fibre and moisture contents and do not contain elevated levels of toxic components (dioxins, mycotoxins, heavy metals).

A new LCMS/MS method to screen for the presence of melamine in animal feed and infant formula was developed. Melamine is an undesirable substance that is present in the environment as a result of widespread use of melamine in the manufacture of plastics, glue, laminates etc. and consequently it may be detected in food and feed at low concentrations. However, because standard tests to estimate protein levels, such as Kjeldahl and Dumas methods, measure the nitrogen content, melamine is sometime illegally added to food and pet food to increase the apparent protein content of these products.

A new ICP/MS method of analysis was also developed and validated for heavy metals (As, Cd, Hg, Pb) and selenium in inorganic feed. Methods for fluorine and theobromine in animal feed were added to the scope of accreditation in 2017 and it is planned to add the melamine method and the multi-analyte heavy metals and selenium method in 2018.

During 2017, a large number of priority samples were submitted for analysis. These included 48 feed, grass and silage samples that were tested for lead as part of an investigation into animal deaths on a farm in the Silvermines area of Co. Tipperary. This area has naturally occurring high levels of lead and herbage can become contaminated where significant amounts of lead enriched soil or sediment may be deposited on grass by flooding.

Other priority samples that were tested in support of investigations into animal deaths included 13 feed and silage samples that were tested for banned antibiotics, penicillin, heavy metals, iodine and fluorine in April,

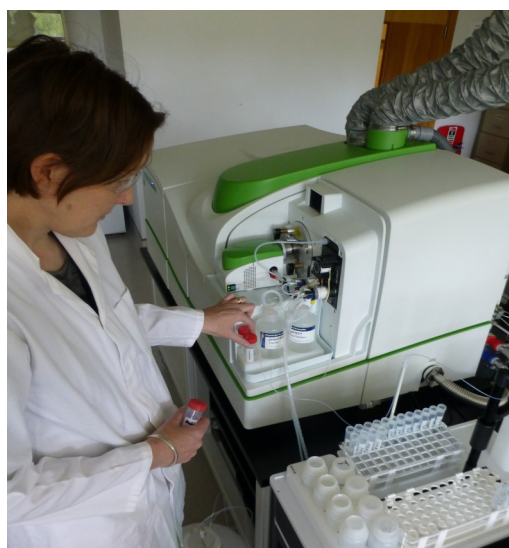
eight pre-mixture and compound feed samples tested for heavy metals and trace elements in June and five that were tested for heavy metals, trace elements and banned antibiotics in November 2017.

Medicated Feed

Prescribed antibiotics can be given to livestock in the form of medicated feed and the correct dosage rate is important to prevent a build up of antibiotic resistance. Feed samples are tested for authorised veterinary medicines and coccidiostats (feed additives used to prevent coccidiosis, a major disease in poultry and other farm animals) to ensure that the correct therapeutic levels are present.

During the production of feed containing antibiotics or coccidiostats, unavoidable carry-over of these compounds can occur from target feed to non-target feed when the same production lines are used, potentially causing harm to the non-target species or build-up of antimicrobial resistance. The Laboratory has LCMS/MS methods that can test for the carryover of 11 coccidiostats in rations destined for non-target species and for the presence of low levels of 14 banned or prescription only antibiotics in a range of feeds.

In July, 78 non-target feed samples from a number of feed mills licensed to produce medicated feed, were tested for carryover levels of the authorised antibiotics sulphadiazine and chlortetracycline. This was part of a survey prior to the introduction of a new EU regulation on medicated feed to check if the feed manufacturers could meet the cross-contamination limits being proposed for the new regulation.



PROGRESS IN RELATION TO GOALS

Strategic Goal 1

Support National Food and Feed Safety Programmes

Food Safety

To ensure that food produced in Ireland is of the highest standard, the Food Safety Authority (FSAI) and DAFM work together to implement comprehensive multi-annual control plans to monitor the production of food at all stages of the food chain and ensure compliance with national and international standards of food safety. The State Laboratory has developed a high level of expertise in the chemical analysis of veterinary drug residues and other chemical contaminants such as dioxins and mycotoxins in food.

Veterinary Drug Residues

The presence of unauthorised substances, residues of veterinary medicinal products or chemical contaminants in food may pose a risk to public health. Under EU legislation (Council Directive 96/23/EC), DAFM administers a National Residues Monitoring Plan (NRMP) which is designed to safeguard consumers from harmful residues in food of animal origin. Animal categories and food products covered include bovines, pigs, sheep and goats, horses, deer, poultry, milk, eggs and honey. A total of nine different matrices are tested including blood, serum/plasma, urine, kidney, liver and fat, depending on the analytes being tested for.

There was a 27% increase in the number of samples tested for veterinary drug residues in 2017, mainly due to increased testing for banned steroids and corticosteroids in milk. A positive release scheme in place for equine kidney samples tested for phenylbutazone and other non-steroidal anti-inflammatories (NSAIDs) remained in place for 2017 with 140 samples prioritised and tested within an average turn-around time of five days. This short turn-around time continued to put a significant strain on the Laboratory's resources but it was considered necessary because a positive phenylbutazone result, as happened in May 2014, would damage Ireland's reputation as a major exporter of high quality fresh meat and meat products.

Chemical Contaminants – Dioxins, Mycotoxins and Nitrates

Dioxins are highly toxic environmental contaminants which must be excluded from the human and animal food chain as approximately 90% of human exposure to dioxins results from the consumption of contaminated food such as dairy produce, meat and fish.

In addition to testing a wide range of feedingstuffs (including recycled foods used for animal feeding), the State Laboratory tests infant formula samples and foods such as milk and vegetable oils used in the dairy industry. Other matrices tested include fat and liver samples from four different animal species under the National Residue Monitoring Plan and samples of eight different species of fish and egg samples for the FSAI. Samples of milk are tested for the Environmental Protection Agency and Cork County Council as part of their annual surveys to monitor background levels of dioxins in the environment.



Overall, there was a 15% increase in the number of samples submitted for dioxin testing in 2017. A new Rocket evaporator system was installed and this resulted in significant time savings which helped to reduce turnaround times and clear backlogs. A new sample preparation system purchased at the end of 2017 should, when it is fully validated and operational, further improve the efficiency of sample preparation for dioxin analysis. There were on-going problems with an ageing HRGCMS instrument and it is planned to purchase a new instrument in 2018 that will facilitate method development for brominated flame retardants, which the Laboratory has been unable to complete to date due to a lack of staff resources and instrument capacity.

Mycotoxins are substances naturally produced by moulds and fungi that can be present on a crop in the field or can affect stored grain. Many mycotoxin producing fungi are able to produce more than one type of mycotoxin and several types of fungi can affect a single crop leading to the presence of multiple mycotoxins. Mycotoxins can cause severe symptoms of toxicity at high doses and they enter the food chain via contaminated animal feedingstuffs.

The State Laboratory uses a multi-analyte LCMS/MS method capable of detecting 16 mycotoxins in feed (12 quantitatively, 4 qualitatively) for routine testing of feed samples. In 2017, a new LCMS/MS instrument was purchased for mycotoxin analysis and a more sensitive method of analysis was developed that can now include all analytes in a single extraction step. This will reduce the analysis time and improve the efficiency of the analysis.

Food samples of animal origin are also tested under the National Residue Monitoring Plan with samples of milk and liver tested for aflatoxin M1 and ochratoxin A respectively.

Patulin is a mycotoxin produced by moulds commonly found on rotting apples and the amount of patulin in apple products indicates the quality of the apples used in production. During 2017, a HPLC method to determine patulin in apple juice was accredited and this is now used routinely to assist DAFM to monitor the quality of apple juices produced in Ireland.

PROGRESS IN RELATION TO GOALS

Strategic Goal 1

Support National Food and Feed Safety Programmes

Pyrrolizidine alkaloids are naturally occurring plant toxins that can cause chronic poisoning and potentially result in liver failure in cattle, horses and pigs. Plants that contain pyrrolizidine alkaloids are normally avoided by grazing animals but animals can be poisoned by eating the plant material in hay, silage and pellets. During 2017, the Laboratory participated in a CEN collaborative pre-trial of an LCMS/MS method for determining twenty-eight pyrrolizidine alkaloids in silage and hay samples.

The Laboratory also participated in a CEN pre-trial for the analysis of free gossypol in feed by LCMS/MS. Gossypol is a toxic substance produced by the cotton plant that can be found in cottonseed and cottonseed products. These by-products of cotton fibre production are rich in oil and proteins and are therefore used in the production of animal feed.

There is concern at EU level regarding the possible health risks associated with high dietary intakes of nitrates and since leafy vegetables are the main source of dietary nitrate, maximum levels have been established for nitrate content in lettuce and spinach and samples taken by DAFM are analysed by the State Laboratory on a regular basis.

National Reference Laboratory Responsibilities

The State Laboratory is a National Reference Laboratory (NRL) in the following areas:

- ◆ residues of veterinary medicinal products (steroids, corticosteroids, non-steroidal anti-inflammatories (NSAIDs), nitroimidazoles and sedatives) in food of animal origin;
- ◆ additives for use in animal nutrition;
- ◆ dioxins and polychlorinated biphenyls (PCBs) in food and animal feed;
- ◆ mycotoxins in animal feed and food of animal origin; and
- ◆ heavy metals in animal feed.

This requires State Laboratory staff to collaborate with the relevant European Union Reference Laboratories (EURLs) on analytical test methods, oversee the performance of screening methods in official laboratories in their areas of competence, and where necessary provide technical assistance and advice to the official laboratories and DAFM as the Competent Authority.



PROGRESS IN RELATION TO GOALS

Strategic Goal 1

Support National Food and Feed Safety Programmes



Fertilisers and Liming Materials

The State Laboratory is Ireland's approved laboratory for checking that fertilisers placed on the market comply with EU legislation. Fertilisers and liming material play an essential role in supporting plant growth and animal production. Fertilisers supply the nutrients required to produce forage and crops, and liming materials ensure that soil pH is optimised to support plant growth. Fertilisers are routinely monitored for the following nutrients: nitrogen, phosphorous, potassium, and sulphur. The minerals magnesium and sodium are also tested for in relevant fertiliser samples. Work was carried out on developing a method for determination of cadmium in fertiliser and this will be validated in 2018.

Liming materials are monitored for particle size, total neutralising value (TNV) and moisture content. This testing is particularly important when new limestone quarries are opened. Regulation (EC) 2003/2003 for fertilisers was amended in 2013 to include liming materials. The purpose of the new legislation was to prevent a diversity of national rules in relation to liming materials leading to distortion of the EU internal market. Where limestone samples submitted for new licence applications are to be evaluated under this new legislation, the fineness of the liming materials has to be determined using a wet sieving procedure and also for these samples total calcium, total magnesium and TNV expressed as CaO values have to be determined.

Numbers of Samples Tested

Food and Feed Safety

Category of Sample	No. of Samples	No. of Analytes Tested For
Veterinary Residues in Food	2,588	13,350
Animal Feedingstuffs	917	5,443
Dioxins in Feed and Food	368	13,265
Mycotoxins in Feed and Food	483	2,011
Nitrates in Vegetables	50	50
Fertilisers / Liming Materials	315	896
Totals	4,721	35,015

New Methods Developed

Test Method	Analytical Technique	No. of Analytes
Heavy metals (As, Cd, Hg, Pb) and Selenium in inorganic feed matrices	ICP/MS	5
Melamine in animal feed	LCMS/MS	1
Total		6

PROGRESS IN RELATION TO GOALS

Strategic Goal 2

Support Revenue Collection and Fraud Prevention

Strategic Goal 2: Support Revenue Collection and Fraud Prevention

The State Laboratory advises the Office of the Revenue Commissioners on the classification of goods and on the application of appropriate excise duties on hydrocarbon oil products and alcoholic beverages and provides an analytical and advisory service in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products.

Customs Samples

The number of samples submitted in the Customs area was similar to 2016. All traded goods such as chemicals, foods, medicaments and plastics imported into or exported from the EU must be classified for Customs purposes and each separate product is assigned a particular classification code. State Laboratory staff have a high level of expertise in this area which enables them to advise Revenue on tariff classification of samples that require chemical analysis to support classification decisions.

An important aspect of this work is attendance at meetings of Technical Committees of both the European Union and the World Customs Organisation where issues relating to the interpretation of tariff headings are discussed and decisions made on the classification of products. In 2017, tariff classification advice was provided for 267 samples.

The Laboratory also provided additional support to the Department of Business, Enterprise and Innovation (DBEI) by providing technical advice on the processing of applications for suspension of Customs Duty. This involved liaising with applicants for duty suspensions and deputising for DBEI staff at relevant meetings. All applications were processed successfully.

The decision of the UK to leave the EU will also have significant implications for the work of the Laboratory, particularly if the UK decides to leave the single market and the EU customs union. Due to the volume of trade between Ireland and the UK, this would result in a large increase in the number of tariff classification opinions requested by Revenue.

Excise Samples

The State Laboratory provides an analytical and advisory service to Revenue in relation to mineral oils, alcoholic beverages and non-potable alcohol-containing products to assist them in determining the appropriate duties applicable and in prosecuting fraud where attempts are made to evade such duties.

Mineral Oil Testing

Rebated (lower-taxed) fuel for off-road use (agriculture/home heating) is marked with dyes or chemical markers so that its use for any other purpose or illegal sale can be identified. A major illicit activity in relation to mineral oil is the laundering of marked fuel to remove these markers. This has been a persistent problem for many years as fuel laundering



poses a serious threat to the Exchequer, to legitimate trade and, because of the processes used in laundering, to the environment.

In recent years, the Revenue Commissioners have implemented a comprehensive and successful strategy to tackle fuel fraud including the introduction of a new fiscal fuel marker in April 2015. In January 2017, a second National Random Sampling Programme of auto fuel traders was conducted, testing for the presence of the new marker, and for the second year, no evidence of the marker was found.

The State Laboratory support the work of Revenue by analysing samples of fuel seized for the presence/absence of oil markers and by providing analytical evidence and expert advice to facilitate court prosecutions. The success of Revenue's actions was evident during 2017 when no laundries were found and the amount of sludge dumping was reduced. The number of fuel oil samples for analysis sent to the Laboratory decreased by 20% in 2017 compared to the previous year, which enabled the Laboratory to clear the backlog of samples that had built up. Turnaround times were significantly improved as a result.

The GCMS method for the determination of the new marker Accutrace S10 in gasoil was further developed to include kerosene and petrol matrices during 2017 and this will be submitted for accreditation in 2018. A new fluorescence method for the confirmation of the presence of coumarin (a UK fiscal marker for kerosene) at concentration levels less than 20% marked was also developed and put into routine use.

PROGRESS IN RELATION TO GOALS

Strategic Goal 2

Support Revenue Collection and Fraud Prevention



Following the petrol contamination / stretching problem that emerged in 2014, petrol samples continued to be submitted for analysis during 2017. These were tested for a range of fuel quality parameters to check for contamination or petrol stretching.

Alcohol Testing

For excise purposes, alcoholic beverages are classified as beers, wines, ciders or spirits, and duty is based on the alcohol content. Counterfeit spirits are illegally produced alcoholic drinks which are often sold to consumers as legitimate product.

Revenue officers target the supply and sale of illegal and counterfeit alcohol. Illicit trade in alcohol occurs through smuggling from countries with lower excise rates, illegally diverting untaxed alcohol onto the

market, or the production of counterfeit alcohol. Vodka is the most commonly counterfeited spirit drink and often contains high quantities of poisonous chemicals such as methanol and iso propyl alcohol. During 2017, Revenue seized 95,021 litres of illicit alcohol with an estimated value of €0.91 million.

The State Laboratory assists Revenue to monitor compliance and to combat excise duty fraud and the production and distribution of counterfeit spirits. Most samples are tested for alcohol content and, where required, congener profiling and testing for authenticity indicators is carried out. A small number of samples containing non-potable alcohol are tested for denaturants.

Sample numbers for alcohol testing increased by 21% in 2017 and the number of potential prosecution samples submitted more than doubled compared to 2016.

NUMBERS OF SAMPLES TESTED

Revenue Collection and Fraud Prevention

Category of Sample	No. of Samples	No. of Analytes Tested For
Customs	274	201
Excise - Mineral Oils	1,224	7,826
Excise - Alcohols	455	779
Totals	1,953	8,806

NEW METHODS DEVELOPED

Test Method	Analytical Technique	No. of Analytes
Accutrace S10 in kerosene and petrol matrices	GCMS	2
Coumarin (<20% marked) in mineral oil	Fluorescence spectroscopy	1
Totals		3

PROGRESS IN RELATION TO GOALS

Strategic Goal 3

Provide a Forensic Toxicology Service to the State



Forensic Toxicology Service

The State Laboratory provides a forensic toxicology service to assist Coroners and the State Pathologist to investigate the causes of unexpected death by analysing post mortem samples to confirm the presence or absence of ethanol, legal and illegal drugs, and other toxic substances. The levels of substances detected are also quantified. Staff attend and give evidence on their findings in legal proceedings and Coroners' inquest as required.

A constant challenge in post-mortem toxicology is the balance between satisfying the clients' demand for a sufficiently complex and timely service whilst ensuring the scope of testing adequately reflects the current drug market. Several recent reports have highlighted the marked increase and severity of Ireland's drug abuse problem. Data collated by the Health Research Board over recent years shows a startling upward trend in polydrug use, involving a combination of alcohol, illicit drugs and prescription medication.

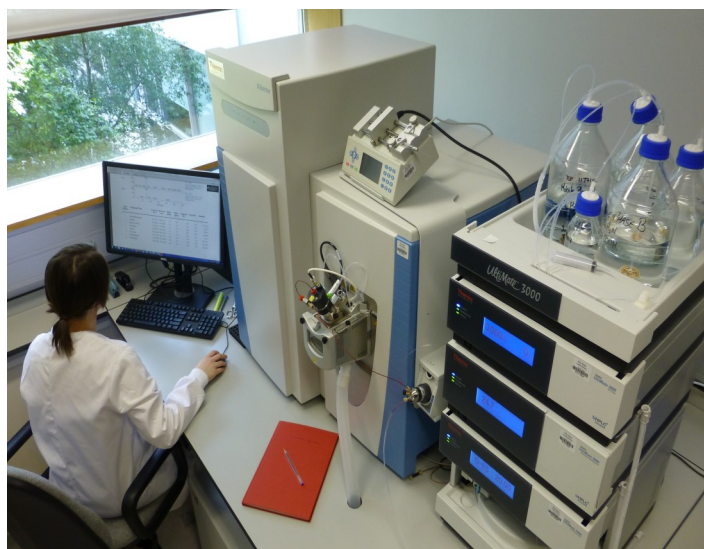
State Laboratory staff are pro-active about using their wide network of contacts to keep abreast of the latest drugs of abuse in circulation and where possible they extend the scope of the methods of analysis to include these new compounds as soon as reference standards become available. The Laboratory is also represented on the Irish national early warning system which is instrumental in identifying new drugs, monitoring trends and making recommendations that ultimately support national harm reduction initiatives.

All post-mortem samples nationwide are submitted to the State Laboratory for both screening and confirmatory analysis and the Laboratory continues to streamline and expand the service provided to all Coroners. During 2017, the Laboratory developed 13 additional tests to detect/quantify prescribed drugs and drugs of abuse in post-mortem samples. This resulted in a 4% increase in the numbers of tests performed compared to 2016, whilst the number of samples increased by just 2%.

Novel psychoactive substances (NPS), more commonly known as

designer drugs, pose a particular analytical challenge because of the rapidly evolving nature of this drug market. Traditionally samples are screened for a defined cohort of prescribed and illicit drugs but now new drug products are easy to access online, often have very similar chemical structures and can be highly toxic in small amounts. Designer drugs are generally "invisible" in traditional toxicology screens and are not available in commercially purchased databases.

Since early 2015, the State Laboratory has developed and implemented an analytical strategy, using high resolution mass spectroscopy (HRLCMS), that allows post mortem toxicology samples to be screened for previously "invisible" designer drugs outside the Laboratory's traditional defined scope of testing. This novel analytical approach is now in routine use with suspect samples being screened for all national and European NPS alerts. This approach also allows for the retrospective analysis of data without physical sample reanalysis. This work has supported the Irish Coroners Service in solving death investigations that previously could not have been satisfactorily concluded.

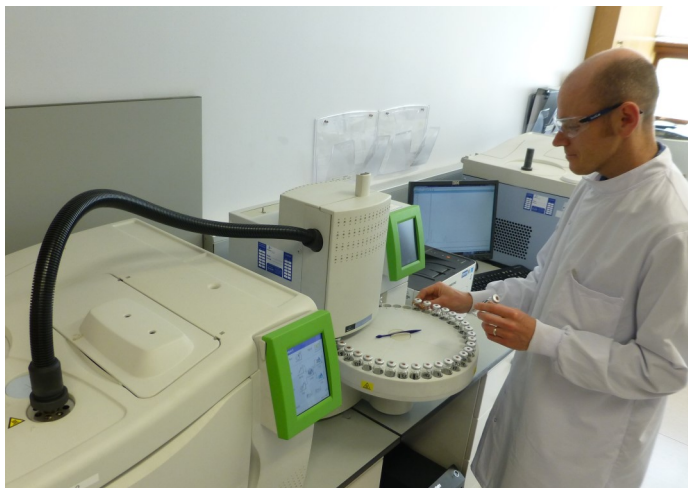


During the period 2012-2017 there was a 51% increase in post mortem sample numbers, which negatively affected turnaround times in recent years. Additional staff and equipment resources were assigned to this work in 2017 with a view to reducing the backlog of samples that had built up because of experienced staff retiring. Extensive cross training across all grades took place in 2017 and this resulted in the Laboratory meeting its turnaround target of 90% of samples being reported within 3 months, with an average of 69 days taken to report cases. This was a significant improvement on 2016, when only 77% of samples were reported within the agreed turnaround time with an average of 77 days to report cases.

PROGRESS IN RELATION TO GOALS

Strategic Goal 3

Provide a Forensic Toxicology Service to the State



NUMBERS OF SAMPLES TESTED

Forensic Toxicology Service

Category of Sample	No. of Samples	No. of Analytes Tested For
Coroners	5,448	449,398
State Pathologist	365	25,588
Criminal Cases	20	2,209
Totals	5,833	477,195

NEW METHODS DEVELOPED

Test Method	Analytical Technique	No. of Analytes
Screening method for drugs in urine extended to include additional drugs	HR/LC/MS/MS	3
Screening method for drugs in blood extended to include additional drugs	HR/LC/MS/MS	8
Confirmatory method for acidic drugs in blood extended	LC/MS/MS	2
Total		13

PROGRESS IN RELATION TO GOALS

Strategic Goal 4

Support Public Health and Environment Protection Initiatives

Public Health Protection

The State Laboratory assists the Health Products Regulatory Authority (HPRA) to control the use of unlicensed medicines by analysing seized pharmaceutical and herbal products for the presence of pharmaceutically active compounds. Scientific staff provide expert testimony in subsequent court prosecutions. The Laboratory also tests a small number of samples from other sources including Customs & Excise officers, the Food Safety Authority of Ireland and the Pharmaceutical Society of Ireland.

During 2017, 10 new methods of analysis were developed and accredited under flexible scope. Many of these methods were for steroids due to the huge increase in the number of anabolic steroids seized by the HPRA, with quantities in the first eight months of 2017 up by 300% compared to 2016. The sale and supply of anabolic steroids to the public outside of a registered pharmacy is illegal and the HPRA have warned that the vast majority of steroids seized in 2017 were found to be counterfeit and posed a direct risk to consumers. The products were illegally manufactured or misrepresented their true source or distribution chain.

Heritage Protection

The State Laboratory provides scientific assistance to the Office of Public Works and a variety of other bodies responsible for the conservation of Ireland's heritage.

In 2017, cooperation between the State Laboratory and the Conservation Department of the National Gallery (NGI) continued. Analysis was carried out on paint fragments taken from a number of paintings to determine the elemental composition of the different coloured paints used. Energy Dispersive XRF analysis was the main technique used for this purpose and the information obtained helped the NGI to decide on the appropriate conservation approach. One of the paintings examined in 2017 was *St. Peter Finding the Tribute Money* by Peter Paul Rubens (reproduced below by kind permission of the NGI).

Infra Red spectroscopy was used to determine the composition of an adhesive for the National Library and the pH of a sample of tissue paper was also determined.



PROGRESS IN RELATION TO GOALS

Strategic Goal 4

Support Public Health and Environment Protection Initiatives

Tobacco Analysis

In April 2017, the State Laboratory was designated by the Department of Health as the testing laboratory for Ireland, for the purposes of carrying out testing on tobacco products as set out in the European Union (Manufacture, Presentation, and Sale of Tobacco and Related Products) Regulations 2016.

During 2018, the Laboratory will set up a tobacco testing facility that will enable it to support the Department of Health and the HSE to enforce the Tobacco Products Regulation. To do this the Laboratory will need to upgrade one of its laboratories to provide the necessary controlled temperature and humidity environment required for the correct operation of a smoking machine. It will also need to procure the necessary instruments and develop suitable methods of analysis to test for tar, nicotine and carbon monoxide in cigarettes. It is hoped to have all of this in place and be in a position to commence testing tobacco products by the end of 2018.

NUMBERS OF SAMPLES TESTED

Public Health and Heritage Protection

Category of Sample	No. of Samples	No. of Analytes Tested For
Medicinal Products	114	125
Heritage Protection	23	22
Totals	137	147

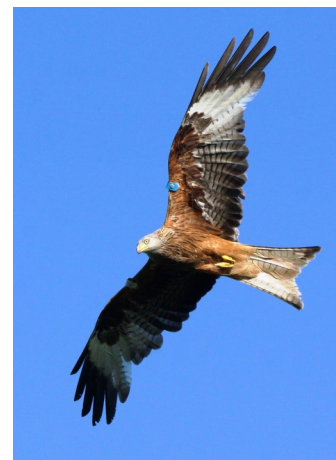
NEW METHODS DEVELOPED

Test Method	Analytical Technique	No. of Analytes
Drugs in medicinal products	HPLC/PDA	8
Drugs in medicinal products	QTof LC/MS	2
Total		10

PROGRESS IN RELATION TO GOALS

Strategic Goal 5

Provide a Centralised Veterinary Toxicology Service



Veterinary Toxicology Service

The State Laboratory provides a toxicant testing service to DAFM and the National Parks and Wildlife Service (NPWS) to assist investigations into suspected poisonings of birds of prey. These include the reintroduced golden eagles, white-tailed sea eagles and red kites and other highly vulnerable species (peregrine falcons, buzzards, kestrels and owls). Support is also provided for investigations into cases of suspected farm or companion animal poisonings.

There was a 15% decrease in the number of samples submitted in 2017. Most of the samples taken from birds contained a variety of rodenticides but in one case alpha and beta chloralose were detected. While the use of second generation anticoagulant rodenticides is important for the effective control of rodents on farms and other food premises, these products need to be used correctly to prevent other wildlife species being accidentally exposed to these products. Of the 11 bird poisoning incidents in 2017, five involved common buzzards, three red kites, one white-tailed sea eagle and one kestrel.

Three samples of suspected poisoned bait were also submitted for analysis. It was found that a sample of mackerel had been laced with nitroxylin (an anthelmintic that is toxic for birds). Samples of pigeon and pheasant had been laced with rat poison. Therefore, not all poisonings were accidental.

Veterinary Products

The Laboratory analyses veterinary medicinal products seized for enforcement purposes by DAFM Investigations Division. Sample numbers were significantly down in 2017, but there were ten new methods of analysis developed compared to just two the previous year.

Staff from the State Laboratory attended four court cases in 2017 in relation to breaches of the Animal Remedies Regulations. These involved possession of unauthorised animal remedies or prescription-only medicines without prescription. In two cases in 2017, pharmacies were convicted of supplying or oversupplying prescription-only medicines without a valid prescription. In another case, a veterinary practitioner pleaded guilty to importing unauthorised animal remedies.

NUMBERS OF SAMPLES TESTED

Veterinary Toxicology Service

Category of Sample	No. of Samples	No. of Analytes Tested For
Toxicants in post mortem samples	159	2,862
Veterinary Medicinal Products	39	39
Totals	198	2901

NEW METHODS DEVELOPED

Category of Sample	No. of Samples	No. of Analytes Tested For
Drugs in veterinary products	HPLC/PDA	8
Drugs in veterinary products	QToF LCMS	2
Totals		10

STUDENT PLACEMENT PROGRAMME

State Laboratory Student Placement Programme

The State Laboratory has been involved in facilitating student placements for many years. The work placement/experience is a compulsory part of the students' four year honours degree course and the placements must be completed before the students begin their final year. The placements are confined to students whose degree courses are particularly relevant to the work of the Laboratory.

The Programme provides students with a developmental opportunity to apply skills and knowledge gained during the first three years of their degree course to a working environment. The Programme also offers the students useful insights for their final year of study and prepares them for seeking employment once they have completed their studies. In addition, it gives the students a realistic and positive insight into the modern Public Service and thereby encourages them to view a career as an Analyst or a Chemist in the State Laboratory and other public service laboratories positively.

During their placement, students obtain experience of the work in the Veterinary Toxicology, Human Toxicology, Contaminants, Animal Feedstuffs and IT Sections of the Laboratory. In the analytical testing

sections the students carry out routine analyses, under the supervision of Senior Analysts/Analysts, on food, animal feed, fertilizers, and biological fluids using classical and instrumental techniques. In the IT Section the placement programme involved helpdesk support, PC maintenance and repair, and troubleshooting for users. All the chemical analyses are carried out according to the Laboratory's quality and safety policies and, in doing so, the students acquire knowledge of the underlying analytical principles and relevant legislative or other background material.

The colleges and degree courses for 2017 were:

- ◆ Dublin City University – Enterprise Computing;
- ◆ Limerick Institute of Technology – Pharmaceutical and Forensic Analysis;
- ◆ Dublin Institute of Technology – Forensic and Environmental Analysis; and Chemical Sciences with Medicinal Chemistry
- ◆ Galway Mayo Institute of Technology – Chemical and Pharmaceutical Science
- ◆ National University of Ireland Maynooth – Pharmaceutical and Biomedical Chemistry

Michael Lillis, Student Analyst, Contaminants Section, 2017

"I was a student from Dublin Institute of Technology where I studied Chemical Sciences with Medicinal Chemistry. In my third year, I was fortunate to obtain a place on the State Laboratory's Student Placement programme. I worked in the Contaminants Section at the State Laboratory, where I assumed the role of student laboratory analyst. From day one I was made to feel like a work colleague and a valued member on the team.

I gained a wealth of laboratory experience which included, preparing different samples for dioxin confirmatory analysis, daily and weekly routine checks, preparing chemical risk assessments, and logging samples onto LIMS.

I used many instruments and software which I would not have had the opportunity to use at college. I was also given the opportunity to validate an instrument during my time in the section, and on completion I delivered a presentation to the team.

The staff at the State Laboratory were supportive, all were very friendly, approachable and had a wealth of experience. I was fortunate to complete my final year project in this Section.



The experience gained at the State Laboratory has given me a fantastic stepping stone towards further developing my career and I would highly recommend the placement opportunity to other students"

Administration

There was a continued emphasis in 2017 on recruitment and filling vacancies due to retirements and other staff movements that occurred during the year.

Shared Services

Shared Services are at heart of the Government's Public Service Reform Plan to maximise new and innovative service delivery channels, to radically reduce costs to drive better value for money and to lead, organise and work in new ways.

The State Laboratory is already a member of the centralised Payroll and HR Shared Services and continued to prepare for the implementation of a Financial Management Shared Services (FMSS) by participating in relevant workshops and working groups.

Staffing

At the end of December 2017, the Laboratory had 95 Whole Time Equivalent (WTE) staff members. This compares with 89 WTEs at the end of 2016.

Eight staff members left the Laboratory during 2017. The following staff retired: Dr. Siobhan Ni Griofa (Senior Chemist) and Liz Ellard (Clerical Officer). One Senior Laboratory Analyst and two Laboratory Analysts resigned to take up positions elsewhere. One Higher Executive Officer, one Administrative Officer and one Clerical Officer completed their periods of secondment.

Thirteen staff joined the Laboratory during 2017. One Chemist Grade III and seven Laboratory Analysts were recruited following open competitions undertaken by the Public Appointments Service and one Executive Officer was appointed to the IT unit. Four staff joined the Laboratory on secondment: one Higher Executive Officer (HR), one Higher Executive Officer (IT) and two Clerical Officers.

In 2017, the Laboratory continued with its student placement scheme in association with Dublin City University; Dublin Institute of Technology; Galway Mayo Institute of Technology; Limerick Institute of Technology and University College Maynooth. Seven students were placed in areas complementary to their academic discipline for a period of six months.

Sick Leave

In 2017, the Laboratory's Lost Time Rate was 2.6% (down from 2.9 % in 2016) and compares with a Lost Time Rate of 4.4% for the Civil Service as a whole in 2017. The average working days lost per full time employee was 6.0 (the Civil Service average was 10.1).

Gender Breakdown in The State Laboratory		
Grade	Female	Male
State Chemist	1	0
Principal Chemist	2	0
Senior Chemist	6	1
Assistant Principal Officer	1	0
Technical Information Manager	0	1
Chemist Grade II	5	6
Chemist	14	10
Higher Executive Officer	2	1
Senior Laboratory Analyst	6	3
Laboratory Analyst	13	10
Executive Officer	0	1
Staff Officer	1	1
Clerical Officer	3	4
Laboratory Attendant	0	5
Total	54	43

Flexible Working Arrangements and Equality of Opportunity

State Laboratory staff can avail of flexible working arrangements including work-sharing, flexitime, parental leave and shorter working year. Staffing shortfalls arising from staff availing of these arrangements have to be absorbed by the Laboratory.

Family Friendly Policies	
Scheme	% of staff availing of scheme in 2017
Worksharing	11%
Parental Leave	7%
Career Breaks	1%
Shorter Working Year	9%

Quality System

The quality of analytical work from the State Laboratory is enhanced through compliance with the quality standard ISO/IEC 17025 (General requirements for the competence of testing and calibration laboratories). The State Laboratory operates in accordance with a documented quality system and is currently accredited to ISO/IEC 17025 by the Irish National Accreditation Board (INAB Reg. No. 146T) for 50 test methods covering 501 analytes.

System of Internal Financial Control

The State Chemist's Statement on Internal Financial Control which can be found at Appendix I was submitted to the Office of the Comptroller and Auditor General along with the State Laboratory's 2017 Appropriation Account

The State Laboratory's Audit Committee met twice in 2017. Internal audits were conducted on Financial Reporting, Treasury & Revenue, Contingency Planning and Crisis Management and, Business Risk Management Cycle. A Review of the System of Internal Control was also carried out and progress on implementing corrective actions recommended in the course of previous audits was tracked.

The Comptroller and Auditor General's Office carried out their annual audit of the State Laboratory's 2017 Appropriation Account in May 2018 and no significant issues were raised during the audit.

Prompt Payments

The State Laboratory did not have late payments in 2017

Financial Information

The following table summarises the State Laboratory's financial expenditure in 2017, with figures for 2016 provided for comparative purposes.

Gross Expenditure	2016 €000	2017 €000
A1. Salaries, Wages & Allowances	4,923	5,279
A2. Travel and Subsistence	30	33
A3. Training and Development & Incidental Expenses	233	248
A4. Postal & Telecommunications Services	56	48
A5. Apparatus & Chemical Equipment	2,169	2,321
A6. Office Premises Expenses	1,457	1,376
A7. Consultancy Services (Internal Audit)	14	13
Gross Total	8,882	9,318

Freedom of Information

The State Laboratory received two non-personal Freedom of Information requests in 2017.

Protected Disclosures

No protected disclosures were received by the State Laboratory in the

Statement by the Accounting Officer on Internal Financial Control

Statement by the Accounting Officer on Internal Financial Control

Responsibility for system of Internal Financial Control

As Accounting Officer I acknowledge my responsibility for ensuring that an effective system of internal financial control is maintained and operated by the State Laboratory. This responsibility is exercised in the context of the resources available to me and my other obligations as Head of Office. Also, any system of internal financial control can provide only reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or irregularities are either prevented or would be detected in a timely manner. Maintaining the system of internal financial controls is a continuous process and the system and its effectiveness are kept under ongoing review.

I have fulfilled my responsibilities in relation to the requirement of the Service Management Agreement between the State Laboratory and the National Shared Service Office for the provision of payroll shared services and human resource shared services.

I rely on a letter of assurance from the Accounting Officer of the Vote for Shared Services that the appropriate controls are exercised in the provision of shared services to the Laboratory.

Financial Control Environment

I confirm that a control environment containing the following elements is in place:

- ◆ financial responsibilities have been assigned at management level with corresponding accountability
- ◆ reporting arrangements have been established at all levels where responsibility for financial management has been assigned
- ◆ formal procedures have been established for reporting significant control failures and ensuring appropriate corrective action
- ◆ there is an Audit Committee to advise me in discharging my responsibilities for the internal financial control system
- ◆ procedures for all key business processes have been documented
- ◆ there are systems in place to safeguard the assets.

Administrative Controls and Management Reporting

I confirm that a framework of administrative procedures and regular management reporting is in place including segregation of duties and a system of delegation and accountability and, in particular, that:

- ◆ there is an appropriate budgeting system with an annual budget which is kept under review by senior management
- ◆ there are regular reviews by senior management of periodic and annual financial reports which indicate financial performance against forecasts
- ◆ a risk management system operates within the State Laboratory
- ◆ there are systems aimed at ensuring the security of the ICT systems
- ◆ there are appropriate capital investment control guidelines and formal project management disciplines
- ◆ the State Laboratory ensures that there is an appropriate focus on good practice in purchasing and that procedures are in place to ensure compliance with all relevant guidelines. The State Laboratory complied with the guidelines with the exception of four contracts to the value of €158,356 which were listed in my annual return in respect of circular 40/2002. These contracts were not competitively procured for the following reasons:

- Two contracts with a total value of €79,951 were awarded to separate companies producing the required brand-specific laboratory equipment for which they were the sole supplier
- One contract to the value of €51,586 was awarded to a supplier who is the sole European agent for the specialist consumables for a particular laboratory instrument
- €27,819 was spent with the supplier of laboratory gases following expiry of the contract in March. The Education Procurement Service (EPS) is establishing a Framework Agreement for this requirement which was delayed.

Internal Audit and Audit Committee

I confirm that the State Laboratory has an internal audit function with appropriately trained personnel, which operates in accordance with a written charter which I have approved. Its work is informed by analysis of the financial risks to which the State Laboratory is exposed and its annual internal audit plans, approved by me, are based on this analysis. These plans aim to cover the key controls on a rolling basis over a reasonable period. The internal audit function is reviewed periodically by me and by the Audit Committee. I have put procedures in place to ensure that the reports of the internal audit function are followed up.

Risk and Control Framework

The State Laboratory has implemented a risk management system which identifies and reports key risks and the management actions being taken to address and, to the extent possible, to mitigate those risks.

A risk register is in place which identifies the key risks facing the laboratory and these have been identified, evaluated and graded according to their significance. The register is reviewed and updated by the Management Board on a bi-annual basis. The outcome of these assessments is used to plan and allocate resources to ensure risks are managed to an acceptable level.

The risk register details the controls and actions needed to mitigate risks and assigns responsibility for operation of controls to specific staff.

Ongoing Monitoring and Review

Formal procedures have been established for monitoring control processes and control deficiencies are communicated to those responsible for taking correction action and to management and the Management Board, where relevant, in a timely way. I can confirm that key risks and related controls have been identified and processes have been put in place to monitor the operation of those key controls and report any identified deficiencies.

Review of Effectiveness

I can confirm that the State Laboratory has procedures to monitor the effectiveness of its risk management and control procedures. The State Laboratory's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal and external auditors and the senior management within the laboratory responsible for the development and maintenance of the internal financial control framework.

Internal Financial Control Issues

No weaknesses in internal financial control were identified in relation to 2017 that resulted in, or may result in, a material loss.



29th March 2018

APPENDIX II

Meetings and Conferences attended by State Laboratory staff

Meetings and Conferences attended by State Laboratory staff

The State Laboratory services EU and other international committees at the request of its client Departments. Laboratory personnel also participate in the work of other international expert scientific bodies and conferences. The following list indicates the range of committee work undertaken by State Laboratory personnel and the meetings and conferences attended during 2017.

- ◆ Codex Alimentarius Committee on Methods of Analysis and Sampling (CCMAS) session in Budapest, Hungary
- ◆ Codex Alimentarius CCMAS EU Working Party meeting in Brussels
- ◆ Eurachem General Assembly in Nicosia, Cyprus
- ◆ Two Eurachem Method Validation Working Group meetings, Rome and Gothenburg
- ◆ Eurachem Ireland workshop on hyphenated techniques
- ◆ 23rd Meeting of the Consultative Committee on Quantity of Material: Metrology in Chemistry (CCQM), BIPM, Sevres, France
- ◆ ISO /CASCO WG44 6th meeting on the revision of ISO 17025 in Geneva.
- ◆ CEN (European Committee for Standardization)
 - ◇ 21st Plenary meeting of CEN/TC 327 Animal Feedstuffs: Methods of Sampling and Analysis, Brussels
 - ◇ Meeting of CEN Technical Committee TC/327 WG4 on Heavy Metals, Trace Elements and Minerals in Animal Feedstuffs, Brussels
 - ◇ Meeting of CEN Technical Committee TC/327 WG3 on Feed Additives and Drugs in Delft
 - ◇ Meeting of CEN Technical Committee TC/327 WG5 Natural Toxins in Animal Feed, Berlin
- ◆ Meetings of European Union Reference Laboratories (EURL) and National Reference Laboratories (NRLs) networks
 - ◇ 6th Workshop of the EURL for Feed Additives (EURL-FA) in Geel, Belgium
 - ◇ 12th Workshop of the EURL for Heavy Metals (JRC - Institute for Reference Materials and Measurements) in Brussels
 - ◇ 12th Workshop of the EURL for Mycotoxins (JRC - Institute for Reference Materials and Measurements) in Geel, Belgium
 - ◇ Workshop of the EURL for Dioxins and PCBs in Feed and Food, Prague
 - ◇ EURL for Dioxins and PCBs meeting in Freiburg in Germany
 - ◇ Workshops of the EURL for Veterinary Drug Residues (RIKILT - Institute of Food Safety) in Wageningen, Netherlands and Berlin
- ◆ Three meetings of UK & Ireland Forensic Toxicology Network (UKIAFT) in London, Edinburgh and Oxford
- ◆ Medico-Legal Society of Ireland Academic Day, Dublin
- ◆ Clinical and Forensic Toxicology in London
- ◆ Club Health Conference in Dublin
- ◆ Labware 2017 European Customer Education Conference, Dublin
- ◆ Nanoparticles in Food EU symposium in Ispra, Italy
- ◆ Workshop on Regulatory Preparedness for Innovation in Nanotechnology in Ispra, Italy
- ◆ European Workshop on Nanoparticle Analysis in Hemel Hempstead, UK
- ◆ Analytix Sample Preparation Seminar in Dublin
- ◆ Health, Occupational Hygiene and Safety: working together to assess risks in Cork
- ◆ Laboratory Safety Management course in Dublin
- ◆ Safeguarding the Food Chain— Protecting Authenticity and Integrity Conference in Dublin
- ◆ Perkin Elmer UK/Ireland ICP MS Users Group meeting in London
- ◆ Thermofisher 2017 Irish Trace Elemental Analysis User Meeting.
- ◆ Irish Mass Spectrometry Society Conference in Dublin
- ◆ National Data Protection Conference in Dublin
- ◆ Conference: Data Summit 2017 in Dublin
- ◆ National Cyber Security Conference in Dublin

Attended on behalf of Revenue and Department of Business , Enterprise and Innovation

- ◆ 33rd Meeting of the Scientific Sub-Committee of the World Customs Organisation in Brussels
- ◆ Customs 2020 19th Customs Laboratories European Network Plenary meeting in Brussels
- ◆ Three meetings of the Customs Code Committee, Agri-Chemical Sector in Brussels
- ◆ Two EU Commission Expert Group meetings on Textiles Names and Labelling
- ◆ Two Project Group meetings dealing with the Chemical Chapters of HS/CN in Brussels
- ◆ Worldwide Spirit Distillers Conference in Glasgow
- ◆ CLEN-CDTPG 2nd Workshop on Customs Detection Technologies in Finland
- ◆ Fiscalis Project Group meeting on denatured alcohols in Brussels
- ◆ Denaturants in alcohol harmonisation of working SOP for all member states in Bordeaux
- ◆ Three meeting of the Economic Tariff Questions Group (Tariff suspensions for chemical and agricultural products) in Brussels

APPENDIX III

Conference & Seminar Presentations by State Laboratory staff

Conference & Seminar Presentations by State Laboratory staff

- ◆ Presentation entitled “Post-mortem Toxicology Updates” to staff in the Office of the State Pathologist
- ◆ Presentation entitled “Overview of Post-mortem Toxicology in the State Laboratory” to staff and students in the Office of the State Pathologist
- ◆ Presentation entitled “The Invisible Killer: Identifying New Designer Drugs in Post-mortem Toxicology” in Backweston Campus
- ◆ Presentation on “A Modern Approach to Human Drug Residue Analysis” at ENFSI Conference in Dublin
- ◆ Presentation entitled “An overview of ICP-MS and its applications in The State Laboratory” at the Eurachem workshop on hyphenated analytical techniques in October 2017
- ◆ Presentation entitled “Principles and Introduction to LC-MS/MS” at Eurachem workshop on hyphenated analytical techniques in October 2017
- ◆ Presentation entitled “Detection of prohibited growth promoters in food producing animals – challenges and possible solutions” to the annual Institute of Chemistry, Ireland Congress
- ◆ Presentation entitled “Troubleshooting in LCMSMS: Case Studies” at the IMSS meeting in Dublin

Conferences and Workshops organised by State Laboratory staff

- ◆ Eurachem Ireland/TrainMiC® Workshop Part III, Dublin
- ◆ Eurachem Ireland “Hyphenated Analytical Techniques—Fundamentals, Applications and Challenges” workshop, Dublin

APPENDIX IV

Irish National Accreditation Board Accredited Tests Summary of Schedule of Accreditation (Edition 25: 14/11/2017) *

* For further details, see our schedule of accreditation (Reg. No. 146T) on the INAB website (www.inab.ie).

Matrix	Measurand	Test Method	Method ID
Animal Feedstuffs	Crude Protein	EN ISO 16634-1:2008. Nitrogen content by the Dumas Principle.	LSD A032
Animal Feedstuffs	Crude Oils and Fats	EU Commission Regulation 152/2009 Annex III (H).	LSD A023
Animal Feedstuffs	Crude Oils and Fats	NIR Spectroscopy.	LSD A031
Animal Feedstuffs	Crude Fibre	EU Commission Regulation 152/2009 Annex III (I).	LSD A024
Animal Feedstuffs	Crude Fibre	NIR Spectroscopy Screening Method.	LSD A031
Animal Feedstuffs	Crude Ash	In house method based on EU Commission Regulation 152/2009 Annex III (M).	LSD A026
Animal Feedstuffs	Crude Ash	Gravimetric method using a Microwave Furnace.	LSD A030
Animal Feedstuffs	Ash Insoluble in HCl	EU Commission Regulation 152/2009 Annex III (N).	LSD A034
Animal Feedstuffs	Moisture	EU Commission Regulation 152/2009 Annex III (A).	LSD A027
Animal Feedstuffs	Macro and Trace Elements (8)	IS EN 15621:2012. ICP OES with Microwave Digestion.	LSD A060
Animal Feedstuffs	Heavy Metals (6)	ICPMS with Microwave Digestion.	LSD A062
Animal Feedstuffs	Nicarbazine	In House HPLC method with DAD, based on IS EN 15782:2009.	LSD A050
Animal Feedstuffs	Monensin, Narasin and Salinomycin	EN ISO 14183: HPLC with post column derivatisation.	LSD A051
Animal Feedstuffs	Coccidiostats (11)	In house LCMSMS Method	LSD A052
Animal Feedstuffs	Antibiotics (14)	In house method using Q Trap LC-MSMS	LSD A095
Animal Feedstuffs	Chlortetracycline	In House HPLC method with DAD	LSD A072
Animal Feedstuffs	Sulphadiazine	In House HPLC method with DAD	LSD A076
Fertilisers	Nitrogen Content	Nitrogen content by consumption by Dumas Principle. In house method based on AOAC official method 993.13.	LSD A036
Animal Feedstuffs	Trace Elements, Heavy Metals and Other Elements (15)	In house method by ICPMS with microwave digestion	LSD A067
Animal Feedstuffs	Iodine	In house ICPMS method	LSD A066
Animal Feedstuffs	Theobromine	In house method using HPLC UV/PDA	LSD A077
Animal Feedstuffs	Fluoride	In house method using ion-selective electrode	LSD A099
Drugs	Flexible Scope (Analyte and Range) Identification and Quantification of pharmaceutical samples	In house method using HPLC –DAD. Complies with relevant requirements of OJEC 2002/657/EC, ICH guideline Q2 (R1), Q2B and Q6A and monographs from British, European and US Pharmacopoeia.	LSD J012
Drugs	Flexible Scope (Analyte and Range) Identification of Pharmaceutical Samples	In house QTOF LCMS method based on the requirements of Commission Decision 2002/657/EC, ICH guideline Q2 (R1), Q6A and monographs from British, European and US Pharmacopoeia.	LSD J044

Irish National Accreditation Board Accredited Tests

Summary of Schedule of Accreditation (Edition 25: 14/11/2017) *

* For further details, see our schedule of accreditation (Reg. No. 146T) on the INAB website (www.inab.ie).

Matrix	Measurand	Test Method	Method ID
Milk (Liquid & Powder)	Aflatoxin M1	Based on ISO 14501:2007 method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD M125
Animal Feedstuffs	Aflatoxin B1	In house method. Extraction and IA column clean-up. RP HPLC with fluorescence detection.	LSD M124
Liver	Ochratoxin A	In house method using IA column cleanup and RP HPLC with fluorescence detection.	LSD M126
Lettuce, Spinach and Cabbage	Nitrates	In house based on EN12014-2:1997-04. Anion exchange chromatography following extraction and clean-up.	LSD M062
Food and Feed	Dioxins and Dioxin-like PCBs (35)	In House GC/HRMS method.	LSD M252
Animal Feedstuffs	Mycotoxins (11)	In house Multi Analyte LCMSMS method	LSD M138
Fruit Juices	Patulin	In house HPLC UV method	LSD M067
Alcoholic Drinks	Alcoholic Strength by Volume	In house using a density meter following distillation.	LSD B010
Gas Oil	C.I. Solvent Yellow 124	In house method. Determination by HPLC.	LSD H009
Liquid Fuels	Accutrace S10 Fuel Marker	In house GCMS method	LSD H033
Blood & Urine	Ethanol	In house method. Determination by internal standard quantitation using Headspace GC with FID.	LSD T003
Animal Urine	Flexible Scope (Matrices, Residues and Ranges) Steroids (18)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V031
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Steroids (14)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V046
Poultry Liver	Flexible Scope (Matrices, Residues and Ranges) Steroids (11)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V061
Animal Serum	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V038
Eggs	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V049
Honey	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V063
Milk	Flexible Scope (Matrices, Residues and Ranges) Nitroimidazoles (7), Chloramphenicol	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V064
Animal Plasma and Milk	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (11, 12)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V039
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Non Steroidal Anti Inflammatory Drugs (12)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V068
Animal Kidney Fat	Flexible Scope (Matrices, Residues and Ranges) Gestagens (5)	In house method by LCMSMS requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V033
Urine	Flexible Scope (Matrices, Residues and Ranges) Corticosteroids (5)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V058

Irish National Accreditation Board Accredited Tests Summary of Schedule of Accreditation (Edition 25: 14/11/2017) *

* For further details, see our schedule of accreditation (Reg. No. I46T) on the INAB website (www.inab.ie).

Matrix	Measurand	Test Method	Method ID
Animal Kidney	Flexible Scope (Matrices, Residues and Ranges) Sedatives (8)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V067
Animal Liver	Flexible Scope (Matrices, Residues and Ranges) Toxicants (8)	In house method. By LCMSMS	LSD V077
Milk	Flexible Scope (Matrices, Residues and Ranges) Corticosteroids (6)	In house method by LCMSMS meeting requirements of Council Directive 96/23/EC (2002/657/EC).	LSD V078

APPENDIX V

Energy Use Statement

Energy Use Statement

In 2017, the gross energy consumption by the State Laboratory was as follows:

- ◆ Electricity 2,373,106 kWh
- ◆ Gas 3,092,912 kWh
- ◆ Total 5,466,018 kWh

The total gross energy consumption value compares with a baseline value (2006-2008) of 7,346,772 kWh. Consequently, the Laboratory's energy performance indicator (EnPI) for 2017 is 29.8% which is an improvement on 2016. Total useable floor area (TUFA) is used as the relevant metric for the Laboratory. Public Bodies must improve their energy efficiency by 33% by 2020 and we will need to see a further improvement of 3.2% if we are to meet this target. Electricity consumption was greater in 2017 than in 2016 by 2.2% but gas consumption was down in 2017 compared to 2016 by 3.7%.

The reduction in energy consumption to date has been achieved by the following measures:

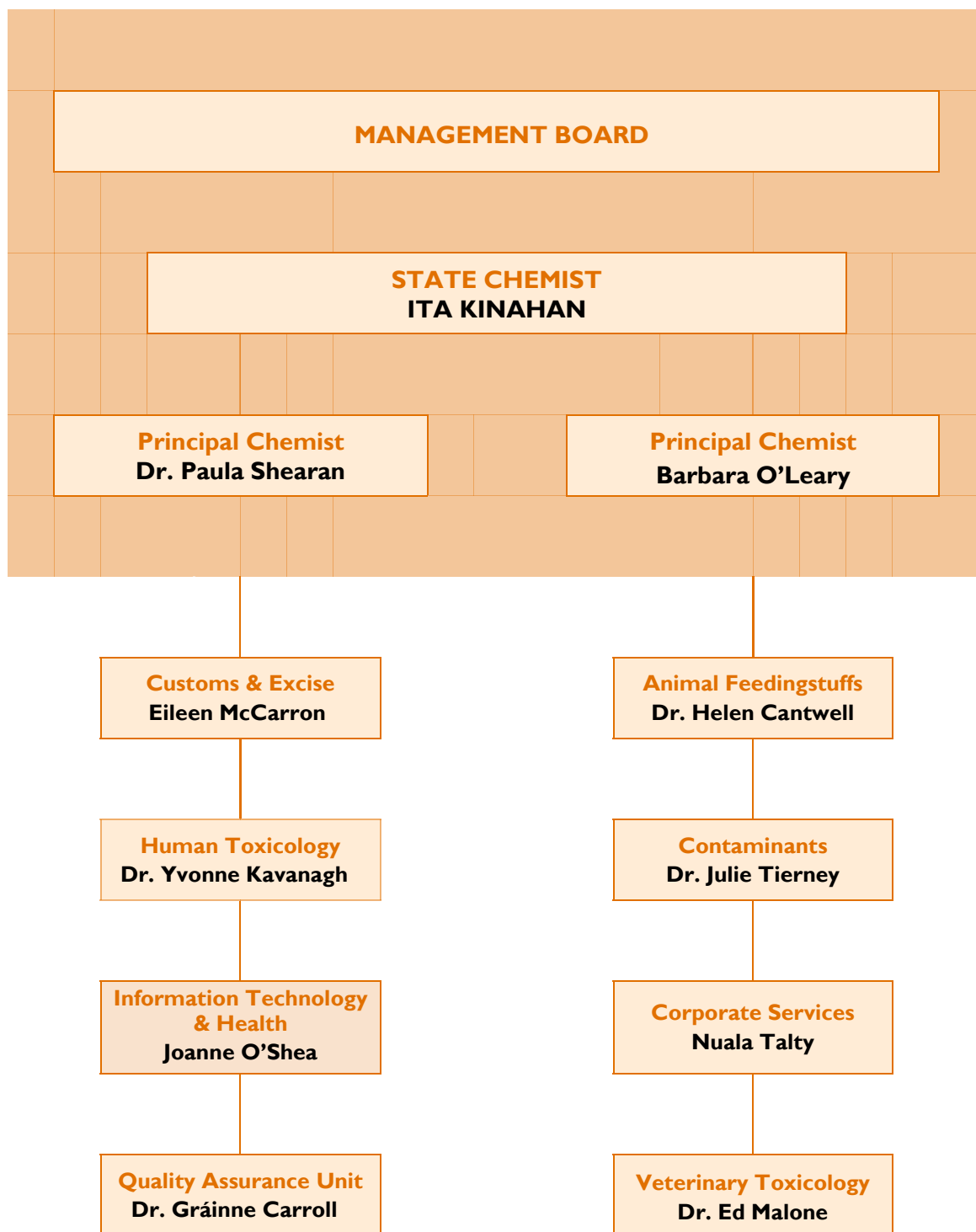
- ◆ reducing the number of air changes per hour in the laboratories to the minimum required to ensure a safe work environment for staff;
- ◆ reducing the flow on air-handling and extraction systems outside of working hours;
- ◆ installing individual switches on fume cupboards to allow users to control their operation more efficiently;
- ◆ incorporating a heat exchanger to recover waste heat from a new air compressor installed in 2015; and
- ◆ engaging staff to reduce unnecessary energy consumption on a day to day basis.



APPENDIX VI

Organisation Chart

(as at 31st December 2017)



APPENDIX VII

Staff List

By Grade (as at 31st December 2017)

State Chemist			
Ita Kinahan			
Principal Chemist			
Barbara O'Leary		Dr. Paula Shearan	
Senior Chemist			
Dr. Helen Cantwell Dr. Gráinne Carroll	Dr. Yvonne Kavanagh Dr. Ed Malone	Eileen McCarron Joanne O'Shea	Dr. Julie Tierney
Chemist Grade II			
Dr. Jonathan Carroll Dr. Eleanor Dixon Dr. Pierrick Fevrier	Dr. John Fields Dr. Seán McGowan Eddie McGrath	Audrey Nugent Ruth Reilly Dr. David Savage	Claire Timbs Mairéad Webster
Technical Information Manager Grade II			
Dr. Michael O'Gorman			
Chemist			
Sinead Bermingham Ann Marie Bragason Dr. Helen Burke David Canny Paula Clarke Dr. Mark Cronly	Michael Doyle Sinead Dunlop Niamh Fitzgerald Joe Fitzsimons Carol Gleeson Lynda Harman	Margarete Houlihan John Judge Ray Kelly Myra Keogh Shonagh Masterson Úna McArdle	Dr. Mark McDonald Dr. Amy Nagle Olivia O'Connor Dr. Colmán Ó Ríordáin John Reilly Patrick Saunders
Senior Laboratory Analyst			
Sheevaun Cody Angela Cunningham Laura Flynn	Fiona Gallagher Marella Gallagher Bernard Hanratty	Tom Harbison Ciara Keane Aengus Ó Briain	
Laboratory Analyst			
Patricia Carter Dr. John Culhane Simon Daly Madeleine Gibbons Johanna Gilligan Veronica Gubarkova	Ian Kelleher Emma Kelly Roisin Latham Vicky MacEoin Sheila Martin Alan Murphy	Conor Noone Dr Tony O'Hara Colm Reid Cathy Rooney Sinéad Ryan Dennis Sheehan	Hannah Smith Niall Stanford Emma Jane Walsh Fiona White Gavan White
Laboratory Attendant			
Simon Chiu Tom Gaule Mark Keane		John Moylan Declan Powell	
Corporate Services			
Nuala Talty - Assistant Principal Judy Conway - Higher Executive Officer Mary Quine - Higher Executive Officer Phyllis Barry - Staff Officer John Clancy - Staff Officer Damien Duffy - Clerical Officer		Angelina O' Shea - Clerical Officer Geraldine Gaffney - Clerical Officer Paul Hirtes - Clerical Officer Eamonn Hoban - Clerical Officer Derek Martin - Clerical Officer Niamh Stafford - Clerical Officer	
ICT			
Anton Bennett - Higher Executive Officer		Gerard O' Brien - Executive Officer	